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A Thrips, Thrips palmi Karny

(THYSANOPTERA: THIRIPIDAE)¹

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INTRODUCTION: Thrips palmi Karny was described in 1925 from Medan, Sumatra, where it was observed infesting mature as well as seedling tobacco plants (Karny 1925) (Fig. 1 adult, Fig. 2 larvae). A few years later this species was discovered as far as India and Sudan westwardly, and Taiwan northwardly. Until the full redescription (Bhatti 1980) became available about 50 years later, however, T. palmi had, for the most part, remained obscure and had long been confused with other species, particularly the common and widely distributed Thrips flavus Schrank. Consequently, very little has been recorded regarding T. palmi's economic importance during this period. One exception was a single incidence of severe injuries recorded on sesame seed pods in southern India (Ananthakrishnan 1955). As soon as its identity was reconfirmed in 1980, however, the destructiveness of T. palmi was quickly demonstrated by a chain of events occurring in a short period of time throughout the Orient and Pacific islands.

In 1979, Ruhendi reported T. palmi infestations on cowpea in the Philippines. Since 1978 in Japan, Saikawa, Kudo, and Yoshihara (1980-1982) reported extensive and yearly T. palmi outbreaks severely affecting year-round plantings of eggplant, pepper, and cucurbits in many vinyl covered warmhouses in Okinawa and the warmer coastal strips of Kyushu and Shikoku and farther north. Gutierrez (1981) also reported T. palmi causing damage to cucurbits in New Caledonia and Wallis Islands since 1978. Infestations on cotton were recorded by Wangboonkong (1981) in Thailand and Bournier (1983) in the Philippines.

In 1982 and 1983, severe infestations of T. palmi were discovered in Hawaii on cucurbits, eggplant, pepper, and amaranth spinach, but infestations declined considerably thereafter (Nakahara 1984). About the same time, severe T. palmi infestations on cucurbits were also reported from Guam. In 1981 and 1982, severe injuries by T. palmi on hairy gourd was reported in Hong Kong by Riddle-Swan (1983). Orius similis was reported preying upon T. palmi in Guangdong Province, China, by Wei et al. (1984).

In Japan, extensive ecological research and a long series of control tests on T. palmi have been conducted since 1979. Yoshihara (1982) cited 122 research papers and reports in his review. The northern limit of T. palmi's natural distribution

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CONTROLS: In Japan (Yoshihara 1982), unlike on field crops, T. palmi was found to be very difficult to control chemically in greenhouses, even with repeated applications of allowable insecticides. None gave more than 80% mortality, requiring supplemental cultural and mechanical methods that have been successfully practiced in greenhouses. Methiocarb was found to be the most effective on cucurbits in New Caledonia. In Hawaii, single treatments of oxamyl (1.2 kg ai/ha) applied to water-melons reduced active immature stages somewhat, but did not affect populations. Two treatments, applied 3 days apart, however, had significantly better results (M. W. Johnson, unpublished data).

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apparently is Japan. The outdoor overwintering normally occurs in Okinawa (26 N), but infrequently it occurs in the southern part of Kyushu (about 32 N). Presumably, it is not found in the rest of the country (above 34 N). These latitudes approaching the northern limit of outdoor overwintering correspond to those of the northern Gulf states of North America. In southern Kyushu where T. palmi overwinters in greenhouses as well as on outdoor vegetation, the field crop plants are infested from early spring, and sometimes suffer severely. However, further north where the insect does not overwinter in fields, greenhouses may serve as foci of the summer field infestations in the otherwise T. palmi-free countrysides.

DISTRIBUTION: Sudan, Pakistan, India, Bangladesh, Thailand, Malaya, Singapore, Indonesia, Philippines, Hong Kong, China (Guangdong), Taiwan, Japan (Okinawa, Kyushu, Shikoku, and Honshu as far north as Shizuoka-ken), Guam, Hawaii, Samoa, Wallis, and New Caledonia.

ECONOMIC IMPORTANCE: T. palmi, a polyphagous feeder with a wide host range, quickly builds up heavy infestations causing severe injuries. Both larvae and adults feed gregariously on leaves (first along midribs and veins), stems (particularly at or near the growing tips), flowers (among the petals and developing ovary) and fruits (on the surface), leaving numerous scars and deformities, and finally killing the entire plant.

Crop plants reported to have been damaged, often severely, are: Solanceae: eggplant (Fig. 3), pepper, potato, tobacco, ground cherry (but strangely tomato escapes); Cucurbitaceae: cucumber, watermelon, muskmelon, cantaloupe, pumpkin, bitter melon, squash, hairy gourd; Leguminosae: kidney bean, broad bean, cowpea, soybean, whiteclover; Misc: chrysanthemum, dahlia, sesame, morning glory, sweet-potato, cotton, cyclamen, and amaranth spinach. In addition, various weeds are also attacked. Heavy damages could be caused to melon and vegetable crops in the warmer areas of the U.S., specifically the Gulf Coast states and parts of the Southwest, if this thrips becomes established in North America.

SURVEY AND DETECTION: Thrips are frequently found in pockets, cracks, or crevices on host material. Look for silvery feeding scars on leaf surfaces of host plants, especially alongside the midrib and veins. Heavily infested plants are characterized by silvered or bronzed appearance of leaves, stunted leaves and terminals, and scarred and deformed fruits. Individuals may be found on all parts of many kinds of plants during the outbreak stage.

DESCRIPTION: Thrips is the oldest genus of Thysanoptera, and many common species belong to this genus. They are readily recognizable by: 1) pronotum with only 2 pairs of major setae at posterior angles (Fig. 4); 2) ocellar setae limited to 2 pairs (Fig. 4); 3) antennal III-IV each with forked sense cone, 4) abdominal V-VIII each with a pair of ctenidia (Fig. 5). The major diagnostic characters for T. palmi are: 1) clear yellow body without any grayish or brownish blotch, but with blackish and thick body setae; 2) interocellar setae outside of ocellar triangle (Fig. 4); 3) metascutum striates in mesial area and posteriorly converges mesad (Fig. 6); 4) abdominal tergite II with 4 lateral setae (Fig. 7); 5) abdominal sternites without accessory setae; 6) abdominal VIII with comb complete in both sexes (Fig. 5); 7) male sternites III-VII each with transverse glandular area. Antennal colors are variable and not reliable for diagnosis.

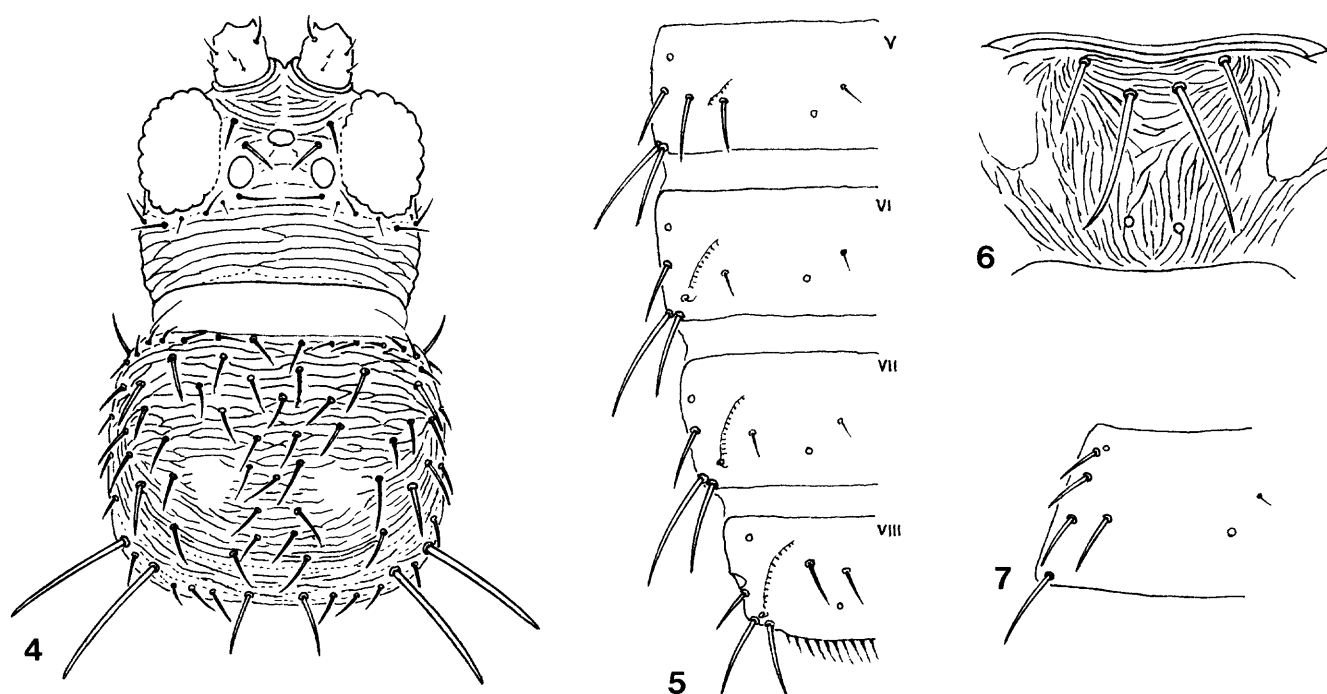


Fig. 1-3. 1) adult *Thrips palmi*; 2) larvae of *Thrips palmi*; 3) feeding damage of *Thrips palmi* (photos courtesy of S. Tsutsui, Tokyo, Japan). Fig. 4-7. *Thrips palmi*: 4) head and pronotum; 5) abdominal V-VIII; 6) metascutum; 7) abdominal tergite II. Drawings by K. Sakimura.